

CLAIMS

1. A process for treating waste streams containing bauxite tailings to substantially neutralize a predominant proportion of alkaline compounds present therein, comprising:

    pulverizing said bauxite tailings into a generally homogenous powder;

    agitating said powder while adding sufficient water to form a generally free flowing slurry;

    adding sufficient acid to the slurry to neutralize said alkaline compounds to a pH of about 5.5 to 6 to form water and an aqueous solution of the salts of said acid; and

    separating said aqueous salt solution from remaining insoluble slurry material.

2. The process of claim 1 wherein said homogenous powder is sufficiently fine to generally pass through a 16 mesh screen.

3. The process of claim 1 wherein said alkaline compound is sodium hydroxide.

4. The process of claim 1 wherein said acid is a mineral acid.

5. The process of claim 4 wherein said mineral acid is sulfuric acid.

6. The process of claim 1 wherein said insoluble slurry materials from the treated, bauxite tailings containing waste stream are further treated to form a component of building material.

7. The process of claim 1 wherein at least a portion of said salt remains with said insoluble slurry material after

removal of water therefrom.

8. The process of claim 6 wherein said building material is cementitious.

9. The process of claim 8 wherein said cementitious building material is a brick.

10. A structural building material comprising a cured, molded component comprising cementitious material, aggregate and up to about 30% by volume pulverized bauxite tailings which have been treated with sufficient aqueous mineral acid to substantially neutralize alkaline compounds present in said tailings.

11. The building material of claim 10 wherein said molded component is a brick.

12. The building material of claim 10 wherein said mineral acid is sulfuric acid.

13. The building material of claim 10 wherein said alkaline compound is sodium hydroxide.

14. The structural building material of claim 10 wherein said aggregate is a silicate containing component in an amount of about 5 to 50 percent relative to the weight of the cementitious material.

15. The structural building material of claim 10 wherein said cementitious material is cement.

16. A process for treating bauxite tailings comprising:  
pulverizing said bauxite tailings into a generally homogenous powder;

agitating said powder while adding sufficient water to form a generally free flowing slurry; and

adding sufficient acid to said slurry to substantially neutralize alkaline values present therein to form water and salts of said values.

17. The process of claim 16 which further includes separating said salts from remaining insoluble slurry material.

18. The process of claim 17 wherein said insoluble slurry material is combined with cementitious material, compacted and cured to form a brick.

19. The process of claim 16 wherein said alkaline values are alkali metal hydroxides and said acid is a mineral acid.

20. The process of claim 16 wherein said neutralization is to a pH of about 5.5 to 6.

21. A process for forming a cementitious material containing treated bauxite tailings comprising:

    pulverizing bauxite tailings containing alkaline compounds into a generally homogeneous powder;

    agitating said powder while adding sufficient water to form a generally free flowing slurry;

    adding sufficient acid to the slurry to neutralize said alkaline compounds to a pH of about 5.5 to 6 to form water and an aqueous solution of the salts of said acid;

    separating said aqueous salt solution from remaining insoluble slurry material; and

    combining said insoluble slurry material in an amount of from about 5 to 50 percent by volume with a cementitious substance to form said cementitious material.

22. The process of claim 21 wherein said cementitious

substance is cement.

23. The process of claim 21 wherein said insoluble slurry is combined with said cementitious substance, compacted and cured to form a brick.

24. The process of claim 23 wherein said brick is cured in a super saturated humidity environment for a predetermined time period.

25. The process of claim 24 wherein said time period is at least 168 hours.

26. The process of claim 21 wherein said acid is sulfuric acid and at least a portion of the said salts of the sulfuric acid that are formed remain with the insoluble slurry material after removal of water therefrom to catalyze subsequent formation of carbonaceous crystals in the cementitious material.

27. The process of claim 26 wherein said insoluble slurry material is not washed subsequent to separating the aqueous salt solution.

28. The process of claim 5 wherein said insoluble slurry material is not washed subsequent to separating the aqueous salt solution.